UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/538,804 | 08/16/2005 | Juichi Ino | 2005_0936A | 8824 |

513 7590 03/09/2009

WENDEROTH, LIND & PONACK, L.L.P.
1030 15th Street, N.W.,
Suite 400 East
Washington, DC 20005-1503

| EXAMINER | |
|---|---|
| BARROW, AMANDA J | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 4111 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 03/09/2009 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/538,804 | INO ET AL. | |
| | Examiner | Art Unit | |
| | AMANDA BARROW | 4111 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *16 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5 and 7-12* is/are rejected.

7)☒ Claim(s) *6, 13 and 14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/13/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1, 2 and 8 are rejected under 35 U.S.C. 102(a) as being clearly anticipated by Komoda et al. (JP Patent Application 2002-270199A) (hereinafter "Komoda").

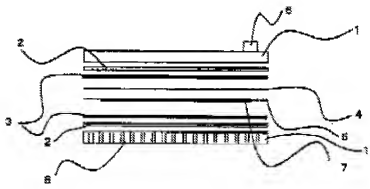
Regarding claim 1, Komoda teaches a solid electrolyte fuel battery comprising a solid polymer electrolyte membrane (5), a fuel electrode (not illustrated; see paragraphs 2 and 13) and an oxidant electrode (not illustrated; see paragraph 2). Both electrodes (not illustrated; see paragraphs 2 and 13) are disposed on both sides of the membrane (5), and a pair of current collectors (charge collectors 3) disposed outside the electrodes (not illustrated; see paragraph 2).

Komoda also teaches a water-retaining material (humidity conditioning layer 4 made up of absorption-and-desorption-of-moisture material) comprising fibers at least the surface layer of which contains a metal oxide: "As absorption-and-desporption-of-moisture material, a silicate, an aluminate, zirconia, manganese oxide, a hexacyano iron-oxide, etc. are mentioned" (paragraph 16). A silicate, manganese oxide and hexacyano iron oxide are all metal oxides. Komodo also teaches that the absorption-and-desorption-of-moisture material can be in many forms including a sheet (paragraph

17) and can be described as having a prolonged tunnel form in one dimension with a pole diameter of 50-150A (paragraph 16). This can be clearly interpreted as being a material with fibers that consist of a metal oxide.

Komoda also teaches that the water-retaining material (humidity conditioning layer 4 made up of absorption-and-desorption-of-moisture material) is combined and integrated with at least the fuel electrode among the solid polymer electrolyte membrane (5), the fuel electrode (not illustrated; see paragraphs 2 and 13) and the oxidant electrode (not illustrated; see paragraph 2): "According to this invention, a humidity layer which consists of absorption-and-desorption-of moisture material in a fuel cell with which a charge collector of a couple [is opposite to] a solid polyelectrolyte membrane via an electrode..." (paragraph 10). The electrode mentioned here is the negative electrode also referred to as the fuel electrode or the anode. The aforementioned reference numbers are diagramed in Drawing 1 below; also see paragraphs 12-23:

【図１】



Regarding claim 2, Komoda teaches that the water-retaining material (humidity conditioning layer 4 made up of absorption-and-desorption-of-moisture material) is in the form of a fiber cloth: "As a porous body which sandwiches absorption-and-desorption-of-moisture material, a thing like textile fabrics, a nonwoven fabric, paper making, and extension porous membrane which has a hole is used" (paragraph 18). Earlier Komoda teaches that the absorption-and-desorption-of-moisture material can be in the form of a sheet (paragraph 17) and can be described as having a prolonged tunnel form in one dimension with a pole diameter of 50-150A. Therefore, a fiber cloth would fit within the descriptions given by Komoda of the water-retaining material (humidity conditioning layer 4 made up of absorption-and-desorption-of-moisture material).

Regarding claim 8, Komoda teaches a water-retaining material (humidity conditioning layer 4 made up of absorption-and-desorption-of-moisture material) for a solid polymer electrolyte fuel battery cell which comprises a woven fabric (textile fabric) (paragraph 18). A textile fabric is a woven fabric as defined by Encyclopedia Britannica: "any filament, fiber, or yarn that can be made into fabric or cloth, and the resulting material itself." Encyclopedia Britannica continues on to say that, "The term is derived from the Latin *textilis* and the French *texere*, meaning "to weave," and it originally referred only to woven fabrics" (*Textile*, Encyclopedia Britannica). Clearly, Komoda teaches that the water-retaining material (humidity conditioning layer 4 made up of absorption-and-desorption-of-moisture material) comprises a woven fabric.

Komoda also teaches that at least the surface layer of which contains a metal oxide: "As absorption-and-desorption-of-moisture material, a silicate, an aluminate, zirconia, manganese oxide, a hexacyano iron-oxide, etc. are mentioned" (paragraph 16). A silicate, manganese oxide and hexacyano iron oxide are all metal oxides.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 4, 5, 7 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komoda et al. (JP Patent Application 2002-270199A) (hereinafter "Komoda"), and further in view of Nagai et al. (JP Patent Application 04-311587 A) (hereinafter "Nagai").

Regarding claim 4, Komoda fails to teach that the water-retaining material is combined and integrated with all of the solid polymer electrolyte membrane, the fuel electrode, and the oxidant electrode; however, Nagai does teach this:

> "The electrochemical unit comprises two electrodes facing each other; and a composite membrane of ion-exchange resin/liquid permeable fibers between these electrodes. The liquid permeable fiber is preferably a hollow fiber. At least one side of the composite membrane of ion-exchange resin/liquid permeable fiber is preferably integrated with an electrode layer side of composite electrode comprising electrode layer and phase separation layer" (abstract).
>
> Nagai continues to teach the advantage behind doing this:
>
> "A three phase interface is formed between the electrode layer, reactant and reaction product. Gas and liquid are separated as the supply/discharge of gas is at the rear side of the electrode, allowing the adjustment of liquid flow rate and high efficiency. The unit is compact."

This is an example of combining prior art elements according to known methods to yield predictable results (See MPEP 2143). It would be obvious to one of ordinary skill in the art to combine the water-retaining material comprising fibers that are integrated with the fuel electrode, oxidant electrode and solid polymer electrolyte membrane to the solid polymer electrolyte fuel battery cell for the reasons given by Nagai: it allows for gas and liquid separation, adjustment of the liquid flow rate so that the anode does not dry out, creates greater efficiency and the unit is compact which is essential in fuel cell applications.

Regarding claims 5 and 11, Komoda fails to teach that the water-retaining material is combined and integrated with both the fuel electrode and the oxidant electrode; however Nagai does teach this (see abstract quotation above). Please see the motivation for combining these prior art elements according to known methods above.

Regarding claim 7, Komoda teaches that a fuel battery uses the solid polymer electrolyte fuel battery cell: "It is possible to make it operate at low temperature, and since [the polymer electrolyte fuel cell] has a high power density..., it's a possibility [to put it] in practical use by the power generation for cars and the power generation for small-scale residences" (paragraph 4). The power generation for most cars constitutes the use of a battery and so Komoda teaches that the polymer electrolyte fuel battery cell is used in a fuel battery.

6. Claims 3, 9, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komoda et al. (JP Patent Application 2002-270199A) and Nagai et al. (JP Patent Application 04-311587 A) as applied to claims 4, 5, 7 and 11 above, and further in view of Pantano et al. (US Patent 6,487,326 B1) (hereinafter "Pantano") and Jones et al. (US Patent 6,439,751 B1) (hereinafter "Jones").

7. Regarding claim 3, Komoda teaches that a fiber cloth can be used as the water-retaining material (humidity conditioning layer 4 made up of absorption-and-desorption-of-moisture material) but fails to teach the cloth being comprised specifically of fibers having an average diameter of 0.10 to 100 micrometers with a basis weight of 1.0 to 300 $g/m^2$ and a thickness of 20 to 1000 micrometers. Nagai does teach that the water retaining material is composed specifically of fibers (see the abstract above); however, the specifics of diameter, basic weight and thickness are not given by Nagai either.

8. It would be obvious to a person of ordinary skill in the art to optimize the cloth to have the optimal best water transport qualities. Silica fibers are well known in the art to have the capability of transporting water and the diameter of claimed silica fibers is

taught by Pantano and Jones who teach silica fibers with diameters of 0.350 micrometers and 100 micrometers, respectively (Jones: column 4, lines 49-65 and Pantano: column 12, lines 46-60). With these diameters, the basis weight of 1.0 to 300 $g/m^2$ would be inherently present in the system if the fibers were woven to a thickness of 200 to 1000 micrometers.

9. Regarding claims 9 and 10, Komoda fails to teach that the water-retaining material is combined and integrated with all of the solid polymer electrolyte membrane, the fuel electrode, and the oxidant electrode; however, Nagai does teach this (see abstract above). The motivation behind combining these prior art elements is stated in the rejection of claim 4.

Regarding claim 12, Komoda fails to teach that the water-retaining material is combined and integrated with both the fuel electrode and the oxidant electrode; however Nagai does teach this (see abstract quotation above). Please see the motivation for combining these prior art elements according to known methods in the rejection of claims 1 and 4.

***Allowable Subject Matter***

10. Claims 6, 13 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***11.*** The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach or suggest that a water-retaining material is combined and integrated within the fuel electrode and a water-retaining material combined and integrated with the oxidant electrode are connected to each other outside the edge of the solid polymer electrolyte membrane.

## *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMANDA BARROW whose telephone number is (571)270-7867. The examiner can normally be reached on 7:30- 5:00 EST Monday - Friday; alternate Friday's off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sines can be reached on (571)272-1263. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jonathan Crepeau/
Primary Examiner, Art Unit 1795